MATH 2011 General Statistics **Lec. 3 Lab 0 Cr. 3**

Effective Date Spring 2008-2009

Course Description

(Also offered as PSYC 2011 and STAT 2011) Prerequisite: A grade of "C" or better in MATH 1021 or MATH 1023, or consent of the department. Graphical display of data, descriptive statistics, probability, the normal distribution, standard scores, confidence intervals and hypothesis testing based on one sample, regression, and correlation.

Course Objectives

Students will:

1. Understand the fundamentals of statistics as represented in the topical outline.
2. Develop critical thinking and problem solving skills, particularly with hypotheses claims.
3. Be able to interpret and create graphs and charts.

Procedures to Evaluate these Objectives

1. In-class problems after concept presentation
2. In-class exams
3. Cumulative final exam

Use of Results of Evaluation to Improve the Course

1. Student responses to in-class problems will be used to immediately help clarify any misunderstandings and to later adjust the appropriate course material.
2. All exams will be graded and examined to determine areas of teaching which could use improvement.
3. All evaluation methods will be used to determine the efficacy of the material presentation.

Detailed Topical Outline

1. Statistics, Data, and Statistical Thinking
    a. Population and Samples
    b. Descriptive and Inferential Statistics
    c. Qualitative Data and Quantitative (discrete and continuous) Data
    d. Sampling Techniques
    e. Observational and Experimental Studies
2. Organizing Data
    a. Frequency Distribution
    b. Histogram, Frequency Polygon, and Cumulative Frequency Polygon
    c. Pie Charts and Stem-and-Leaf Plots

3. Descriptive Statistics
    a. Parameter and Statistic
    b. Measures of Central Tendency (mean, median, mode and midrange)
    c. Measures of Variation (range, variance and standard deviation)
    d. Chebyshev's Theorem and Empirical Rule
    e. Measures of Position (percentiles and quartiles)
4. Fundamentals of Probability
5. Discrete Probability Distributions
    a. Probability Distribution of a Random Variable
    b. Expected Value (Mean), Variance, and Standard Deviation
    c. Binomial Probability Distribution
    d. Other Discrete Distributions (Multinomial, Poisson, Hypergeometric)
6. Normal Probability Distribution
    a. Graph and properties of a Normal Curve
    b. Finding Probabilities when z-scores or x-values are given
    c. Finding z-scores or x-values when Probabilities are given
    d. Central Limit Theorem (finding probabilities when mean and standard deviation are given)
    e. Normal Approximation to the Binomial
7. Confidence Intervals
    a. Confidence Intervals that contain the Population Mean using z-scores and t-values
    b. Confidence Intervals for Variances and Standard Deviations
8. Inferences Based on a Single Sample
    a. Tests of Significance
    b. Testing a Population Mean (z-test and t-test)
    c. Chi-Square Test for a Variance or Standard Deviation
    d. Additional topics regarding hypothesis testing
9. Simple Linear Regression
    a. Correlation and Linear Regression equations
    b. Testing significance of a sample correlation at 5 percent and 1 percent level of significance